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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/981,414	10/17/2001	Carmo Ribeiro	3156/30140	6270

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EXAMINER

LOPEZ, FRANK D

ART UNIT PAPER NUMBER

3745

DATE MAILED: 08/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/981,414	Applicant(s) RIBEIRO ET AL.	
	Examiner F. Daniel Lopez	Art Unit 3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-77 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18, 20-69 and 71-77 is/are rejected.
- 7) ☒ Claim(s) 19 and 70 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 Oct 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> | 6) <input type="checkbox"/> Other: _____ |

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 328 (page 13 line 3). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: on page 13 line 14 "9" should be --10--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 7 and 60-62 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 7 line 1 "the web portions" should be --the strut portions--, to agree with claim 1 line 10-11.

In claim 60 line 1, claim 61 line 3, claim 62 line 2 "said joint" has no antecedent basis; suggest that these claims depend from claim 59, instead of 58.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in--

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

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(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claim 77 is rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Jarrett.

Claims 35-39, 42-44, 47, 58, 59, 61-64 and 66 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Amdall.

Claims 35-44, 47, 58, and 63 are rejected under 35 U.S.C. § 102(b) as being clearly anticipated by Baster.

In the above claims, the limitation that the piston or a part of the piston is forged (e.g. claim 35 line 7) is a product by process limitation, and is limited to structure implied by the process (MPEP 2113).

"Even though product - by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product - by - process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe , 227 USPQ 964, 966 (Fed. Cir. 1985)

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product - by - process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 218 USPQ 289, 292 (Fed. Cir. 1983)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 35, 42, 44-54, 56, 58-66, and 71-76 are rejected under 35 U.S.C. § 103 as being unpatentable over Jarrett in view of Kemnitz et al. Jarrett discloses a piston comprising a piston head (42) having a ring belt with a plurality of ring grooves (66, 68, 70) formed therein and a combustion bowl (46); a pair of pin bosses (150) extending downwardly from the piston head and having pin bores (118) aligned along a common axis transverse to a longitudinal axis of the head; a piston skirt (110) in one piece with the bosses wherein the bosses include tapered inner faces (e.g. column 4 line 62-67) set at an angle such that the width of the bosses increase continuously across the bores, and separated by a lateral space; a cavity (formed in part by 144, 102) is an oil gallery located above the bores in open communication with the space and being undercut in the bosses so as to extend laterally outwardly of the inner faces of the bosses in the direction of the boss axis, the piston head includes upper (42) and lower (44) forged steel crown parts having adjoined inner walls forming the inner wall and having a friction welded joint (column 5 line 50) passing through the cavity; wherein the piston head includes a second oil cooling gallery (140) with a closed bottom end; but does not disclose that the piston skirt includes a pair of opposed skirt portions spaced from the bosses and intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses, symmetrical about a longitudinal axis containing the pin bore axis and the longitudinal axis, formed in the strut portions; or that the skirt portions have an upper free edge spaced and decoupled from the upper crown portion.

Kemnitz et al teaches, for a piston comprising a piston head having a ring belt (4) with a plurality of ring grooves formed therein and a combustion bowl (6); a pair of pin bosses extending downwardly from the piston head and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head; and a piston skirt in one piece with the bosses; that the piston skirt including a pair of opposed skirt portions (11) spaced from the bosses and intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses, symmetrical about a longitudinal axis containing the pin bore axis and the longitudinal axis, formed in the strut portions (the recess is relative to the outer surface of the skirt); and that the skirt portions have an upper edge either fixed to the upper crown portion (fig 4) or spaced and decoupled from the upper crown portion (fig 2).

Since the piston skirts of Jarrett and Kemnitz et al are functionally equivalent in the piston art; it would have been obvious at the time the invention was made to one having ordinary skill in the art to make the piston skirt of Jarrett include a pair of opposed skirt portions spaced from the bosses and intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses, symmetrical about a longitudinal axis containing the pin bore axis and the longitudinal axis, formed in the strut portions; and with an upper free edge of the skirt portions spaced and decoupled from the upper crown portion, as taught by Kemnitz et al, as a matter of engineering expediency.

Claims 1-8, 13-18, 20-24, and 26-34 are rejected under 35 U.S.C. § 103 as being unpatentable over Jarrett in view of Kemnitz, as applied to claim 35 above, and further in view of Berchem et al and Reinberger. The modified German 3,032,671 discloses all of the elements of claims 1-16, 18, 20 and 21, including that there is an oil drain access opening; but does not disclose that the method of making the piston includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, the skirt and a portion of the oil gallery; further forging the blank in a second axial

direction in line with the pin bore axis, to produce the recesses; and with the oil drain access opening forged.

Berchem et al teaches, for a method of making a piston comprising a piston head (10) having a ring belt and a combustion bowl; a pair of pin bosses (5) extending downwardly from the piston head and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head; that the method includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, and an upper surface of the blank; and further forging the blank in a second axial direction in line with the pin bore axis, to produce the pin bores.

Reinberger teaches, for a method of making a piston comprising a ring belt, a pair of pin bosses (14) extending downwardly from a piston head and having pin bores (14a) aligned along a common axis transverse to a longitudinal axis of the head and a piston skirt (13); that the method includes die forging a blank in a first axial direction, longitudinally of the piston, to produce the bosses and the skirt.

Since German 3,032,671 discloses using a pressed component and Berchem et al and Reinberger teaches a method of forming a pressed component; it would have been obvious at the time the invention was made to one having ordinary skill in the art to make the pressed piston skirt component of German 3,032,671 by die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, an upper surface of the blank (forming the oil gallery floor), including the oil drain access opening, and the piston skirt; and further forging the blank in a second axial direction in line with the pin bore axis, to produce the pin bores and recess, as taught by Berchem et al and Reinberger, as a matter of design choice. One of ordinary skill in the die forging art would know how to form the oil gallery floor, the oil drain access opening and the recess by the forging operation, for the purpose of decreasing the post forging machining operations.

Claims 67-69 are rejected under 35 U.S.C. § 103 as being unpatentable over Jarrett in view of Kemnitz, Berchem et al and Reinberger, as applied to claim 1 above, and further in view of Tool Engineers Handbook. The modified Jarrett discloses all of

the elements of claims 67-69; but does not disclose that an inner wall of the skirt portion is tapered in the longitudinal direction such that an upper region of the skirt portion is thicker than the lower end, with an angle between the inner and outer walls of the skirt portion being about or greater than 3 degrees.

Tool Engineers Handbook teaches, for a part that is forged and has an inside surface; that the inside surface is tapered (draft) at an angle of 10 degrees, for the purpose of easily withdrawing the die from the forged part (page 1021 second full paragraph).

Since the modified Jarrett and Tool Engineers Handbook are both from the same field of endeavor (i.e. dealing with forged parts), the purpose disclosed by Tool Engineers Handbook would have been recognized in the pertinent art of Jarrett. It would have been obvious at the time the invention was made to one having ordinary skill in the art to forge the skirt of Jarrett with a slightly tapered inner wall, in the longitudinal direction such that an upper region of the skirt portion is thicker than the lower end, at an angle of 10 degree, as taught by Tool Engineers Handbook, for the purpose of easily withdrawing the die from the forged piston.

Claims 45, 46, 50, 60, 65, 71, 72 and 76 are rejected under 35 U.S.C. § 103 as being unpatentable over Amdall in view of Martins Leites et al. Amdall discloses a piston comprising a piston head (18) having a ring belt (24) with a plurality of ring grooves formed therein and a combustion bowl; a pair of pin bosses (15) extending downwardly from the piston head and having pin bores aligned along a common axis transverse to a longitudinal axis of the head; a piston skirt (20) in one piece with the bosses including a pair of opposed skirt portions (20a, 20b) spaced from the bosses and intervening strut portions (see e.g. fig 2) extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges; recesses (see e.g. fig 3, between 50 and bosses) formed in the strut portions; wherein the bosses include inner faces set at an angle such that the bosses have a varying width longitudinally, and separated by a lateral space; a cavity (formed in part by 46) located above the bores in open communication with the

space and being undercut in the bosses so as to extend laterally outwardly of the inner faces of the bosses in the direction of the boss axis, the piston head includes upper and lower crown parts having adjoined inner walls forming the inner wall and having a welded joint (19) passing through the cavity; wherein the piston head includes an oil cooling gallery (26) with a closed bottom end (formed by 50, e.g. fig 6, 7); but does not disclose that the weld joint is a friction weld joint; that the upper and lower crown are made of steel; or that the inner faces are set at an angle such that the width of the bosses increase continuously across the bores.

Martins Leites et al teaches, for a piston comprising a piston head (10) having a ring belt with a plurality of ring grooves (15) formed therein and a combustion bowl (11); a pair of pin bosses (23) extending downwardly from the piston head and having pin bores (24) aligned along a common axis transverse to a longitudinal axis of the head; wherein the bosses include inner faces set at an angle such that the bosses have a varying width longitudinally, and separated by a lateral space; a cavity (formed in part by 12) located above the bores in open communication with the space and being undercut in the bosses so as to extend laterally outwardly of the inner faces of the bosses in the direction of the boss axis, the piston head includes upper and lower crown parts having adjoined inner walls forming the inner wall and having a welded joint passing through the cavity; that the weld joint is a friction weld joint, for the purpose of welding without melting the materials to be joined, thereby maintaining the structural properties of the materials (column 2 line 51-52); that the upper and lower crown are made of steel (column 2 line 31-33, line 42-44); and that the inner faces are set at an angle such that the width of the bosses increase continuously across the bores.

Since Amdall and Martins Leites et al are both from the same field of endeavor, the purpose disclosed by Martins Leites et al would have been recognized in the pertinent art of Amdall. It would have been obvious at the time the invention was made to one having ordinary skill in the art to make the weld joint of Amdall a friction weld joint, as taught by Martins Leites et al, for the purpose of welding without melting the materials to be joined, thereby maintaining the structural properties of the materials; to make the upper and lower crown of Amdall of steel, and make the inner faces of Amdall

increase continuously across the bores, as taught by Martins Leites et al, as a matter of engineering expediency.

Claims 35-44, 47, 48, and 50 are rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Baster. German 3,032,671 discloses a steel piston comprising a piston head (2) having a ring belt with a plurality of ring grooves (7) formed therein and a combustion bowl (10); a pair of pin bosses (32) extending downwardly from the piston head and having pin bores aligned along a common axis transverse to a longitudinal axis of the head and having laterally opposed edges; a piston skirt in one piece with the bosses including a pair of opposed skirt portions; an upper end of the piston skirt includes inner and outer walls welded to inner and outer walls of a lower end of the ring belt, forming a closed oil cooling gallery (6) in the piston head; but does not disclose that the pair of opposed skirt portions are spaced from the bosses and intervening strut portions extend between and unite the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses formed symmetrically across a longitudinal plane containing the longitudinal axis of the piston and the bore axis, in outer surfaces of the strut portions, skirts and bosses, which extend laterally inwardly of the pin bore edges and across the longitudinal axis above the pin bore axis and are spaced from the lower edges of the skirt.

Baster teaches, for a piston comprising a piston head (10) having a ring belt with a plurality of ring grooves (23) formed therein and a combustion bowl (19); a pair of pin bosses (32) extending downwardly from the piston head and having pin bores (33) aligned along a common axis transverse to a longitudinal axis of the head; a piston skirt in one piece with the bosses including a pair of opposed skirt portions (46); that the pair of opposed skirt portions are spaced from the bosses, with intervening strut portions extending between and uniting the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, with recesses (45) formed symmetrically across a longitudinal plane containing the longitudinal axis of the piston and the bore axis, in outer surfaces of the

strut portions, skirts and bosses, which extend laterally inwardly of the pin bore edges and across the longitudinal axis above the pin bore axis and are spaced from the lower edges of the skirt, for the purpose of reducing an amount of oil wiped from the cylinder wall, to improve lubrication of the rings carried by the ring belt (column 4 line 3-8).

Since German 3,032,671 does not show details of the pair of opposed skirt portions, and Baster does; it would have been obvious at the time the invention was made to one having ordinary skill in the art to space the pair of opposed skirt portions of German 3,032,671 from the bosses and use intervening strut portions to extend between and unite the skirt portions to the bosses, with the strut portions presenting outer surfaces facing in opposite directions along the bore axis and having lower edges, as taught by Baster, as a matter of engineering expediency, and with recesses formed symmetrically across a longitudinal plane containing the longitudinal axis of the piston and the bore axis, in outer surfaces of the strut portions, skirts and bosses, which extend laterally inwardly of the pin bore edges and across the longitudinal axis above the pin bore axis and are spaced from the lower edges of the skirt, as taught by Baster, for the purpose of reducing an amount of oil wiped from the cylinder wall, to improve lubrication of the rings carried by the ring belt.

Claims 1-16, 18, 20, and 21 are rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Baster, as applied to claim 35 above, and further in view of Berchem et al and Reinberger. The modified German 3,032,671 discloses all of the elements of claims 1-16, 18, 20 and 21, including that the skirt portion is a pressed steel component (abstract) and has an oil drain access opening; but does not disclose that the method of making the piston includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, the skirt and a portion of the oil gallery; further forging the blank in a second axial direction in line with the pin bore axis, to produce the recesses; and with the oil drain access opening forged.

Berchem et al teaches, for a method of making a piston comprising a piston head (10) having a ring belt and a combustion bowl; a pair of pin bosses (5) extending downwardly from the piston head and having pin bores (7) aligned along a common axis transverse to a longitudinal axis of the head; that the method includes die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, and an upper surface of the blank; and further forging the blank in a second axial direction in line with the pin bore axis, to produce the pin bores.

Reinberger teaches, for a method of making a piston comprising a ring belt, a pair of pin bosses (14) extending downwardly from a piston head and having pin bores (14a) aligned along a common axis transverse to a longitudinal axis of the head and a piston skirt (13); that the method includes die forging a blank in a first axial direction, longitudinally of the piston, to produce the bosses and the skirt.

Since German 3,032,671 discloses using a pressed component and Berchem et al and Reinberger teaches a method of forming a pressed component; it would have been obvious at the time the invention was made to one having ordinary skill in the art to make the pressed piston skirt component of German 3,032,671 by die forging a steel blank in a first axial direction, longitudinally of the piston, to produce the bosses, an upper surface of the blank (forming the oil gallery floor), including the oil drain access opening, and the piston skirt; and further forging the blank in a second axial direction in line with the pin bore axis, to produce the pin bores and recess, as taught by Berchem et al and Reinberger, as a matter of design choice. One of ordinary skill in the die forging art would know how to form the oil gallery floor, the oil drain access opening and the recess by the forging operation, for the purpose of decreasing the post forging machining operations.

Claims 67-69 are rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Kemnitz, Berchem et al and Reinberger, as applied to claim 1 above, and further in view of Tool Engineers Handbook. The modified German 3,032,671 discloses all of the elements of claims 67-69; but does not disclose that an inner wall of the skirt portion is tapered in the longitudinal direction such that an upper

region of the skirt portion is thicker than the lower end, with an angle between the inner and outer walls of the skirt portion being about or greater than 3 degrees.

Tool Engineers Handbook teaches, for a part that is forged and has an inside surface; that the inside surface is tapered (draft) at an angle of 10 degrees, for the purpose of easily withdrawing the die from the forged part (page 1021 second full paragraph).

Since the modified German 3,032,671 and Tool Engineers Handbook are both from the same field of endeavor (i.e. dealing with forged parts), the purpose disclosed by Tool Engineers Handbook would have been recognized in the pertinent art of German 3,032,671. It would have been obvious at the time the invention was made to one having ordinary skill in the art to forge the skirt of German 3,032,671 with a slightly tapered inner wall, in the longitudinal direction such that an upper region of the skirt portion is thicker than the lower end, at an angle of 10 degree, as taught by Tool Engineers Handbook, for the purpose of easily withdrawing the die from the forged piston.

Claim 77 is rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Martins Leites et al. German 3,032,671 discloses all of the elements of claim 77, including that the skirt portion is forged from a single piece of steel, with the pin bosses (see abstract); but does not disclose that the weld is a friction weld. Claims 45, 46, 49, 51, 53-57, 71, 73 and 76 are rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Baster, as applied to claim 35 above, and further in view of Martins Leites et al. The modified German 3,032,671 discloses all of the elements of claims 45, 46, 49, 51, 53-57, 71, 73 and 76, including a ring groove located below the weld joint, that the oil gallery is formed by a circumferential recess extends into the skirt portion and that the weld in the outer walls is below the weld in the inner walls; but does not disclose that the weld is a friction weld or that the weld in the outer walls is above the weld in the inner walls. Claims 17 and 22-26 are rejected under 35 U.S.C. § 103 as being unpatentable over German 3,032,671 in view of Baster, Berchem et al and Reinberger, as applied to claim 15 and

21, respectively, above, and further in view of Martins Leites et al. The modified German 3,032,671 discloses all of the elements of claims 17 and 22-26; but does not disclose that the weld is a friction weld

Martins Leites et al teaches, for a steel piston comprising a piston head (10) having a ring belt with a plurality of ring grooves (15) formed therein and a combustion bowl (11); a pair of pin bosses (23) extending downwardly from the piston head and having pin bores (24) aligned along a common axis transverse to a longitudinal axis of the head; wherein the piston head includes upper and lower crown parts having adjoining inner and outer walls joined together by a welded joint; that the weld joint is a friction weld joint, for the purpose of welding without melting the materials to be joined, thereby maintaining the structural properties of the materials (column 2 line 51-52).

Since German 3,032,671 and Martins Leites et al are both from the same field of endeavor, the purpose disclosed by Martins Leites et al would have been recognized in the pertinent art of German 3,032,671. It would have been obvious at the time the invention was made to one having ordinary skill in the art to make the weld joint of German 3,032,671 a friction weld joint, as taught by Martins Leites et al, for the purpose of welding without melting the materials to be joined, thereby maintaining the structural properties of the materials.

German 3,032,671 teaches that the weld joint in the outer wall can be in a variety of positions, including in the upper surface, so as to be above the weld joint in the inner wall. Since the position of the weld joint in the outer wall can be in a variety of places; it would have been obvious at the time the invention was made to one having ordinary skill in the art to locate the weld joint in the outer wall of German 3,032,671 above the weld joint in the inner wall, as taught by German 3,032,671, as a matter of engineering expediency.

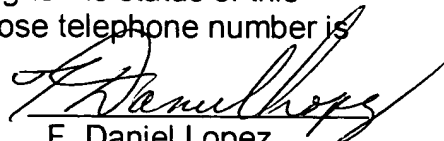
Conclusion

Claims 19 and 70 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Lopez whose telephone number is (703) 308-0008. The examiner can normally be reached on Monday-Thursday from 6:30 AM -4:00 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Look, can be reached on (703) 308-1044. The fax number for this group is (703) 872-9302. Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0861.



F. Daniel Lopez
Primary Examiner
Art Unit 3745
August 14, 2002